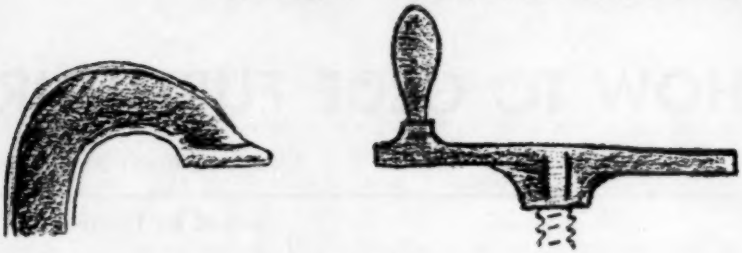
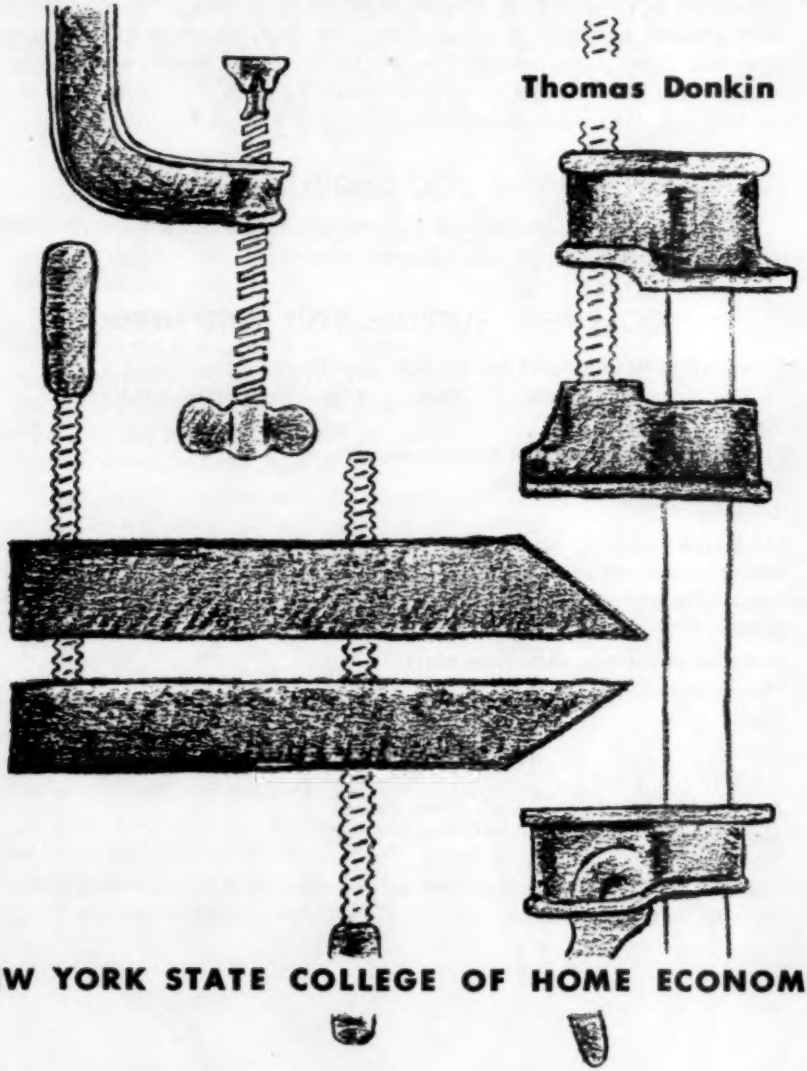
CORNELL EXTENSION BULLETIN 684



HOW TO GLUE FURNITURE

Thomas Donkin



NEW YORK STATE COLLEGE OF HOME ECONOMICS

HOW TO GLUE FURNITURE

Charlotte Brennan Robinson

revised by Thomas Donkin

WHY FURNITURE COMES APART

Furniture comes apart when the glue "bond" at the joints is loosened. Animal glues, generally used in mass produced furniture, are subject to attack by fungus organisms. They also dry out and become brittle, or they may be weakened by moisture. All these changes in the glue weaken the joints, and looseness in any one joint puts extra strain on the other joints until they too become loosened.

WHAT YOU SHOULD DO

To repair a piece of furniture permanently, you should take it apart, clean off the old glue, and reglue and reassemble the joints.

TOOLS AND SUPPLIES YOU WILL NEED

Glue: See chart on page 4 for the right glue for the job
Clamps: Rope tourniquets, "C" clamps, parallel jaw clamps, bar clamps
Vise
Claw hammer or leather or wooden mallet
Brace and bit, and hand drill
Small saw
Sharp jack knife
Dowel sticks—the same size as missing or broken rungs
Dowel pins—grooved pins, ⅜-inch or ⅝-inch in diameter, to mend dowel joints
Abrasive paper and smoothing block
Newspapers
Rags
Shears
Vinegar (½ pint)
Blocks of wood to use as pads under clamps
Masking tape and pencil

Some repair jobs do not require all the material in this list; others need supplies that are not listed.

TO PREPARE FOR GLUING

Mark the parts of every joint with a number or letter so that you can get them back together again correctly. A piece of masking tape makes a good tag for this purpose. Mark *all* joints in this way. You may have to take apart more than one.

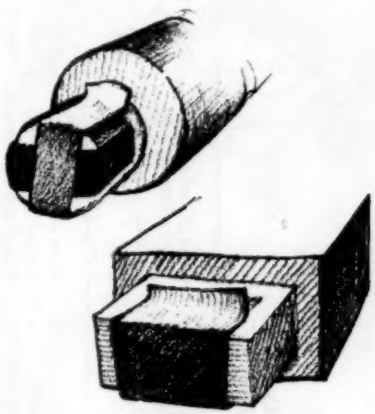
Pull all the loose joints apart. Use a hammer to loosen the joints that do not pull apart easily. Protect the furniture from dents with a block of wood or a thick pad of folded newspaper. Be careful that you do not break parts if you must force them out of position during this operation.

Joints that are firm and tight should be left undisturbed if possible. If such a joint *must* be loosened, soak it with warm vinegar to soften the glue.

Scrape or chip off all the old glue; be careful not to remove any wood. If you cannot remove the glue by chipping or scraping, or if there is danger of damaging the wood, soften the old glue with warm vinegar. This is a very sticky process which saturates the wood so that you must wait for the wood to dry before you can continue.

You need *not* remove all the glue from the end grain of the joint; simply chip off the thickest lumps. Joints are usually constructed with clearance between the end of the dowel, or round, and the bottom of the hole so that the joint will fit snugly at the shoulder.

When the parts are clean and dry, reassemble them to test for proper fit. If there is any joint that is loose, it can be tightened as in Figure 1. If a hole for a round rung is much too large, it can be plugged with a piece of dowel and rebored.



1. Cut or tear strips of cloth to fit over end of joint. Apply glue to end of joint and press strips into the glue. Apply more glue and assemble the joint.

TO GLUE PARTS

Have all materials, tools, and glue ready to use. Have the furniture and the glue at room temperature; cold glue and cold wood will not bond properly.

Coat the surfaces to be joined with glue and press the pieces into place, checking the marks you made earlier to be sure of getting each part in the right place. Assemble the parts quickly and apply pressure as soon as possible. It is important to maintain pressure until the glue has set.

USE THE RIGHT GLUE

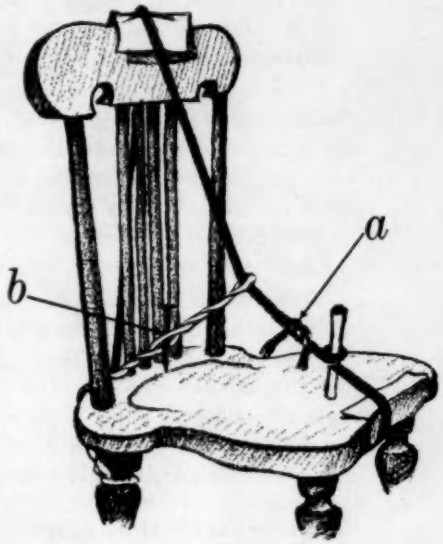
	LIQUID HIDE	PLASTIC RESIN	CASEIN	POLYVINYL (white)	RESORCIN RESIN
ADVANTAGES	Easy to use Keeps well Will not stain	Water resistant Very strong	Glues oily woods—teak, rosewood, yew Fills gaps	Dries clear Easy to buy—use Fills well Fast setting	The only glue that is completely waterproof
DISADVANTAGES	Deteriorates in moist conditions Subject to fungus attack	Not good for poorly fitting joints Requires considerable clamping pressures	Stains some woods Varies in strength Subject to fungus attack	Deteriorates in moist conditions Discolors metals	Dark glue line Complicated mixing High cost
WATER RESISTANCE	Poor	Good	Fair to Good	Fair	Excellent
PREPARATION	Ready to use	Mix powder with water	Mix powder with water	Ready to use	Mix powder with resin
WORKING TEMPERATURE	70°F. or warmer Warm both work and glue in colder temperatures	70°F. or warmer	Above freezing	50°F. or warmer Heat hastens setting	70°F. or warmer Heat hastens setting
APPLICATION	Thin coat to both surfaces Let get tacky, then join	Thin coat to both surfaces	Thin coat to both surfaces	Coat one surface Clamp at once	Thin coat to both surfaces
MIX LIFE AT 70° F.	——	4 hours	8 hours	——	4 hours
CLAMPING TIME					
Hardwood	2 hours	16 hours	2 hours	1 hour	16 hours
Softwood	3 hours	16 hours	3 hours	1½ hours	16 hours

TO CLAMP JOINTS

There are many different types of clamps which you can use to apply pressure to the freshly glued joints (see cover). One of the most efficient substitutes for clamps is the rope tourniquet. Two turns of rope (new clothesline is good), tied snugly and twisted with a stout stick, will provide a great deal of pressure quickly and easily.

Determine the direction in which pressure is needed before you apply the clamps or rope. The clamping device should draw the two parts of the joint together without any sideways movement.

When a chair back is being glued and downward pressure is needed, pass the rope over the back and under the seat, and make a tourniquet (see figure 2). If the rope tends to slip off a curved back or seat, tie it in place. Be sure to protect the wood or the finish from damage by using thick newsprint pads under the clamps or ropes.



2. Position tourniquet "a" first and tighten enough to remove slack. Then apply tourniquet "b" and tighten as much as possible.

TO GLUE DIFFERENT KINDS OF JOINTS, CRACKS, AND BREAKS

Rungs that cannot be taken apart

Loose joints that have been pegged or nailed are very difficult to knock apart without damaging the wood. Glue may be introduced into these joints by using a small oil can, plastic squeeze bottle, or a special tool called a glue injector.

Drill a small hole (1/16 inch) in an inconspicuous spot at an angle to, or alongside, one part of the loose joint. Insert the tip of the injector into the hole and force glue into the joint. Glue should be forced out around the joint. When this "squeeze out" appears, clamp the joint, wipe off the excess glue, and let it dry.

Doweled Joints

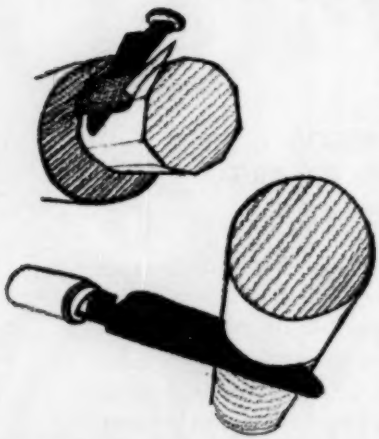
Doweled joints are the modern equivalent of the hand-cut mortise and tenon joint. This joint when properly made in well-seasoned wood will hold as well, or better, than the older type of joint. The difficulty in separating a doweled joint is that one end of the dowel is likely to remain fast in its hole.

When a dowel pin breaks, leaving an end in the hole, bore the dowel out of the hole with a brace or hand drill; use a bit or wood drill slightly smaller than the thickness of the dowel. Do not bore beyond the length of the dowel because the hole may become too deep or the bit may go right through to the other side. Usually, you can tell when to stop because the dowels are always shorter than the depth of the hole and you will feel the drill or bit "give" as you break through the end of the dowel.

With a small chisel or penknife, chip and force out what remains of the dowel pin but do not cut the hole any larger. Then select a new pin that fits the hole snugly and that is from $\frac{1}{8}$ inch to $\frac{1}{4}$ inch shorter than the depth of the hole. Dowel pins with groves are best because they let the air and excess glue come out as the pin is put in place. If the parts of the joint do not come close together, the dowel pin may be too long. Cut a piece off the end of the pin, round it with a sharp knife or with sandpaper, and glue.

Dowel sticks for chair rungs

If an old rung of the same size as the broken or missing one cannot be found, a dowel stick may be used to replace the broken rung. Select one of the same diameter as that of the rungs already on the chair. To get the length, measure the distance between the legs and add the depth of the holes into which the dowel stick will be glued. Cut dowel to this length. The holes that form the joint are usually smaller in diameter than the rung itself. The ends of the new rung must be shaved down to fit snugly in this hole. When you have determined the depth of the hole, mark this distance on the end of the dowel, and make a cut around the rung with a sharp knife.



3. Method of reducing end of dowel to fit hole and form shoulder.

Shave the dowel end to fit the hole (figure 3). Round the end slightly with a knife or sandpaper and trim the other end of the dowel the same way. Be sure both ends fit well before gluing.

If a turned rung is missing, inquire at a second-hand store for replacement.

Broken parts

Legs, rungs, spindles, and arms that are broken *with the grain* can be glued; those broken across the grain need special tools and skill.

A new break can be glued and clamped immediately. To repair a break that has been glued before, first remove the old glue and then reglue.

Small cracks

Cracks, such as those at the ends of table leaves, can be glued. Force the crack open carefully with several small wedge-shaped pieces of soft wood. Tap the point of each wedge into the crack with a hammer beginning at the edge, until the crack is opened. Be careful not to split the crack farther. Work the glue into the crack with a slim stick, or knife blade. Remove the wedges and clamp the crack.

Veneer

Small pieces of loose veneer and blisters may be glued in place. Lay the loose piece of veneer face down on a flat surface and scrape off the glue. Do not wet the veneer. Then apply the glue to the furniture but *not* to the veneer. Lay the veneer in place, add a paper pad, and clamp it down, or lay a weight on top of it. Be sure the weight covers and holds in place all parts of the piece of veneer. Curved surfaces can be weighted with a sandbag.

Blisters

With the point of a sharp thin knife, cut a slit at the side of the blister where the veneer is still glued. Be sure to follow the grain of the wood. Hold the slit open with the knife, fill the blister with warm vinegar, and let it stand for several hours to dissolve the glue. Remove any vinegar that remains; let the blister and the surrounding wood dry thoroughly before you add the glue. Then work the glue under the blister and clamp it down or lay a weight on it.

Door panels and drawer bottoms

You may be surprised to find that door panels, drawer bottoms, and similar wide, thin sheets of solid wood have no traces of glue in the joints. This is as it should be and, when reassembling such panels, care should be taken not to use glue on them.

Wood swells and shrinks across the grain with changes in moisture content. This movement in a pine panel, 12 inches wide, might amount to one eight of an inch or more. If the wood is held stationary by glue or other fastenings, considerable force is created—enough to split the panel or the joints of the frame. Allow these panels to "float" in the grooves; don't glue them in.

A GOOD GLUING JOB

When you have completed the repair, you should find the following to be true:

- The piece of furniture is solid with no movement in any structural joint.
- The area around the repair is clean and smooth with no evidence of dripping glue or clamp marks.
- The furniture is square and true, not twisted or distorted in any way.

After the repairs are thoroughly dry, finish any replacement parts to match the original finish. A final polishing or waxing will put the article back in service for many years of use.

A publication of the New York State College of Home Economics a unit of the State University of New York, at Cornell Universiy

OCTOBER 1958

Cooperative Extension Service, New York State College of Home Economics at Cornell University and the U. S. Department of Agriculture cooperating. In furtherance of Acts of Congress May 8, June 30, 1914. M. C. Bond, Director of Extension, Ithaca, New York.